



Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

Elsevier hereby grants permission to make all its COVID-19-related research that is available on the COVID-19 resource centre - including this research content - immediately available in PubMed Central and other publicly funded repositories, such as the WHO COVID database with rights for unrestricted research re-use and analyses in any form or by any means with acknowledgement of the original source. These permissions are granted for free by Elsevier for as long as the COVID-19 resource centre remains active.

LETTER

RESEARCH LETTER

Efficacy of medical students' virtual dermatology curriculum

To the Editor: With the COVID-19 pandemic and subsequent moratorium on away rotations, many third- and fourth-year medical students have not been able to fulfill their clinical experiences, particularly outside of their home institution. Dermatology is a specialty that is well-positioned for didactic lecture instruction as well as remote consultations with patients, given the accessibility of cutaneous disease. Online dermatology curricula have been shown to be effective teaching tools for medical students and residents in primary care specialties.^{1,2}

We designed and implemented a “Basic Dermatology” elective for third-year students and an “Advanced Dermatology” for fourth-year students. Our 4-week online curriculum was composed of self-guided learning centered around the American Academy of Dermatology Basic Dermatology Curriculum, free-access online dermatopathology modules, high-yield, case-based lecture series with faculty and residents on a topic of their interest, and daily dermatopathology signout.

We utilized an established online, virtual curriculum alongside a 20 case-based lecture series provided by the faculty and dermatology residents to enhance knowledge and application in lieu of an in-person clinical experience. Students attended resident morning conferences, dermatopathology

signout, and grand rounds. They also participated in “virtual happy hours” with the residents and one-on-one meetings with the faculty leadership to simulate typical away rotation experiences. Qualitative and descriptive data were measured through an optional, anonymous single survey using the Likert scale at the end of the rotation. Additionally, an optional, anonymous pre- and post-curriculum dermatopathology quiz, with a random ID generator to link surveys, was given to measure the efficacy of our curriculum.

Of the 16 students enrolled in the curriculum, 15 completed the end-of-rotation survey (Table I). All participants strongly agreed or agreed that the course improved their clinical knowledge in dermatology. All of them strongly felt that participating in this virtual curriculum helped them gain familiarity with the Medical College of Wisconsin's dermatology residency program and network with the faculty. Further, all participants strongly agreed or agreed that they are more likely to consider the Medical College of Wisconsin for dermatology residency than prior for the rotation. Notably, students found morning conferences and online pathology resources to be the least helpful to their learning due to low interactivity or advanced level of the topics.

Ten students completed the pre- and post-curriculum quizzes on dermatopathology. There was a 67% average increase in scores, from an

Table I. Condensed comments from the end-of-rotation survey

Positive feedback	<ul style="list-style-type: none"> • ...learned that a lot of valuable learning can still be done virtually and surprisingly you are able to build strong relationships with your classmates • ...enjoyed the faculty-led discussions, which allowed us to learn basic dermatologic concepts in a fun, engaging, case-based format. • ...learned SO much about dermatopathology from this rotation! I never truly been introduced to dermpath concepts... this was a really helpful rotation for learning the basics.
Suggestions for improvement	<ul style="list-style-type: none"> • More resident and faculty lectures if possible, but I understand that working around different schedules can be challenging. • ...(morning conferences were) hard to follow because we just jumped onto advanced derm topics, however, it was good exposure. • Encourage those leading lectures to call on a specific student or direct questions at specific students ... virtual format makes it difficult to answer questions because everyone is all talking at once • ...consider adding an option for work on an optional research project, such as a brief case report, with residents and/or attendings

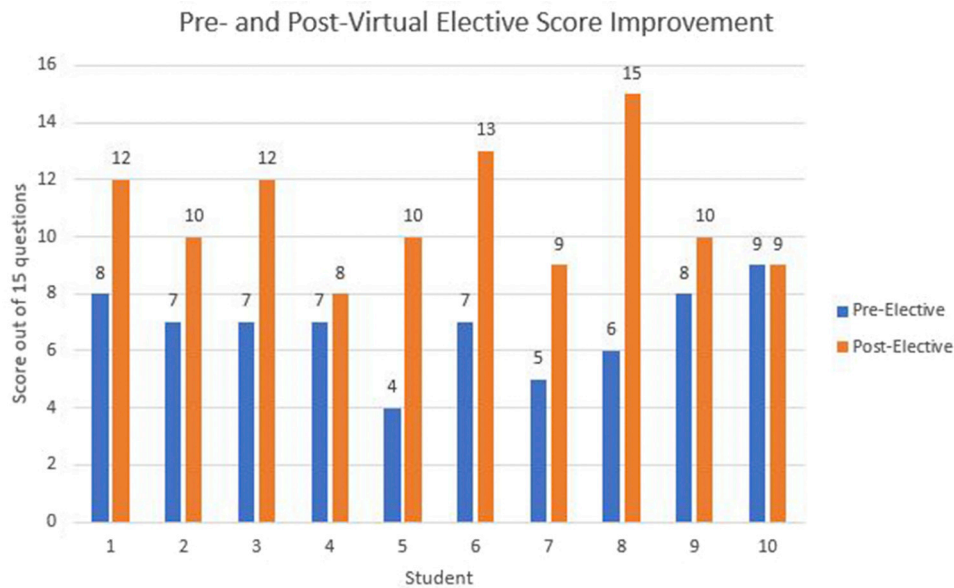


Fig 1. Results of pre- and post-curriculum survey on dermatopathology.

average of $45\% \pm 13\%$ before to $72\% \pm 14\%$ after the virtual curriculum (Fig 1).

With the possibility that virtual teaching will remain a relevant and important modality through the pandemic and beyond, we highlight the feasibility and efficacy of a virtual curriculum to teach medical students. Surveys showed that we were able to feature the culture of our program, residents, and faculty to the visiting students. Given the flexible nature of virtual content delivery, there may be future opportunities for students to partake in tele-dermatology visits, further enhancing their clinical exposure. This virtual rotation may also make it feasible to recruit students who do not have a home dermatology training program or cannot afford the costs of in-person rotations. This curriculum can be easily modified and may serve as an additional way to reach more students, particularly those entering primary care.

Dylan Trinh, BS, Karolyn A. Wanat, MD, Gretchen M. Roth, MD, Kara Young, MD, and Stephen R. Humphrey, MD

From the Department of Dermatology at the Medical College of Wisconsin, Wauwatosa, Wisconsin.

Funding sources: None.

IRB approval status: Reviewed and approved by MCW/FH IRB #5 (approval #PRO00037995).

Reprints not available from the authors.

Correspondence to: Dylan Trinh, BS, Medical College of Wisconsin, 8701 W Watertown Plank Road, Wauwatosa, WI 53226

E-mail: dtrinh@mcw.edu

Conflicts of interest

The authors have worked on this project with an American Academy of Dermatology Basic Dermatology Curriculum workgroup member.

REFERENCES

1. Cipriano SD, Dybbro E, Boscardin CK, Shinkai K, Berger TG. Online learning in a dermatology clerkship: piloting the new American Academy of Dermatology Medical Student Core Curriculum. *J Am Acad Dermatol*. 2013;69(2):267-272.
2. Svoboda SA, Swigert A, Nielson CB, Motaparathi K. Inspired by COVID-19 isolation: evolving educational techniques in dermatology residency programs. *Clin Dermatol*. 2021;39(1):41-44.

<https://doi.org/10.1016/j.jaad.2021.05.014>